



# Steep Slope Pipeline Construction Design, Safety and Integrity Considerations

**Presented to the Atlanta Pipeliner's Club**

February 14, 2022



# Safety Minute

**Safety Director  
Coordination**

**EMR  
0.70**

**OSHA  
rate:  
0.00**

**ISN  
score  
"A"**

**HASP on every  
project**

**Industry Participation**

**Willis Towers Watson** 



**Tailgate Meetings**

**JSA**

**Fall Prevention**

**Energy  
Isolation**

**Suspended  
Loads**

**Excavation &  
Trenching**





# Presentation Agenda



**1** Preliminary Routing

**2** Site Investigation



**3** Design

**4** Construction



**5** High Hazard Area Monitoring

# 1 Preliminary Routing Analysis

## Key Elements

### Route Study:

- Parcel Count
- Major Roadway Crossings
- Major Env Resource Crossings
- Known Recognized Environmental Concerns
- Constructability

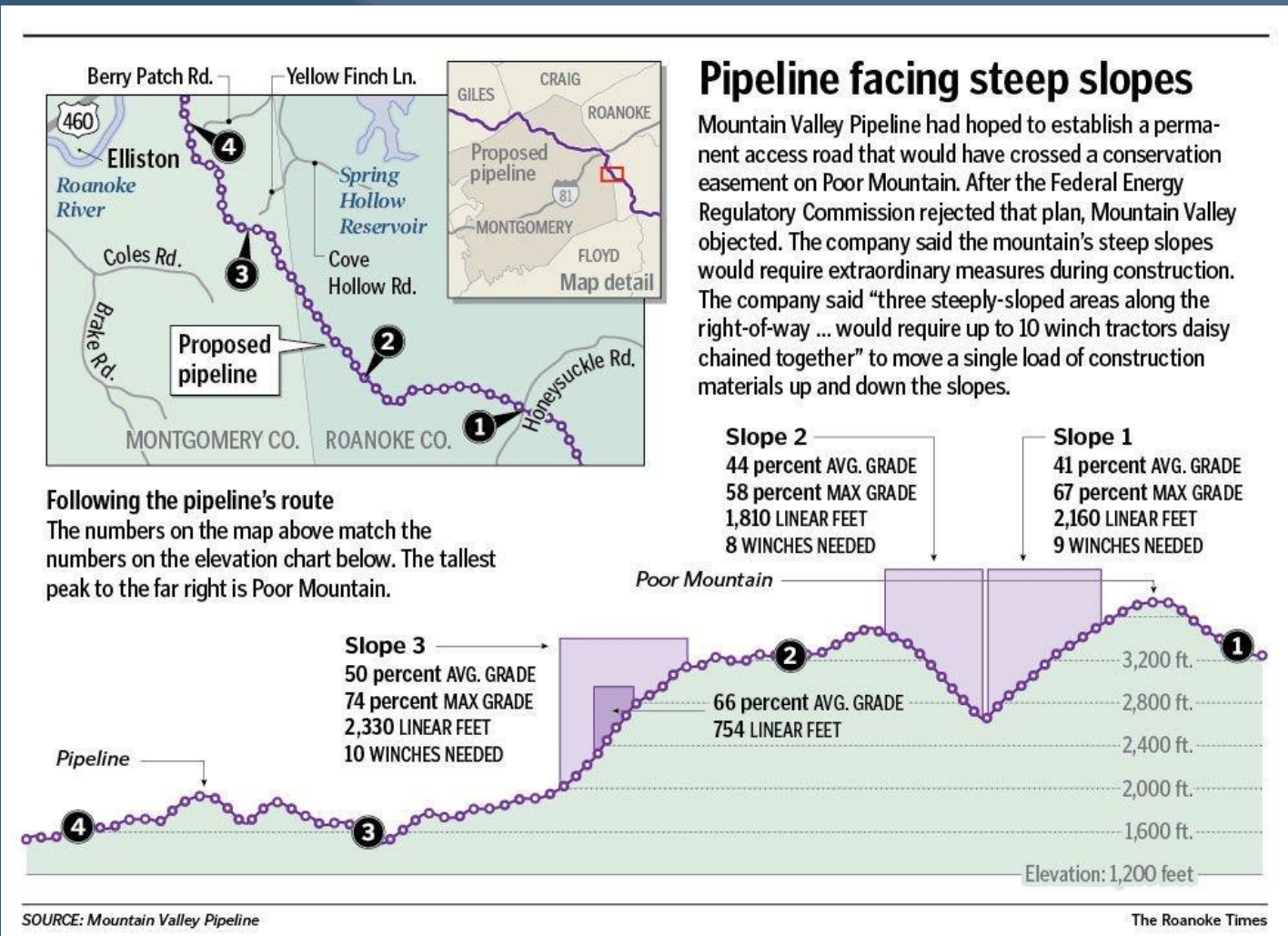
Table 4-1: Cumming to GPC Corridor Analysis Summary					
Project Features	Corridor 1	Corridor 2	Corridor 2A	Corridor 3	Corridor 4
Length (ft.)	61,315	63,484	59,598	59,096	67,223
Private Easement (linear ft.)	55,040	49,985	45,129	47,387	63,235
Adjacent to Existing Road ROW	6,275	13,499	14,469	11,709	3,988
Parcels Impacted*	109	110	110	139	130
Private Driveway Crossings	15	23	30	32	12
Highway Crossings	3	3	3	3	3
Local Residential Street Crossings	11	16	19	17	9
Railroad Crossings	0	0	0	0	0
Stream Impact (linear ft.)	25 (10,771')	27(10,884')	27 (10,884')	16 (5,417')	29(12,153')
Open Water to HDD (#)	3	5	5	4	3
Wetland Disturbances (acres)	14	14	14	15	18.4
Threatened & Endangered Species	9	9	9	9	9
Natural Preservation & Conservation Areas	0	0	0	1	0
Known Contaminated Sites and Facilities	2	2	2	3	2
Number of Open Cuts (length linear ft.)**	17 (400')	27 (708')	29 (762')	52 (950')	15(330')
Number of HDD (length linear ft.)**	13 (2,795')	15(3,462')	18(4,062')	12(2,425')	17(2,761')
*Includes parcels within 50' of corridor.					
**Linear footages are estimated by measuring the surface, these are to be used as approximations.					



# 1 Preliminary Routing

## Constructability

- Access
- Materials Staging Areas
- ROW width vs Constructability width

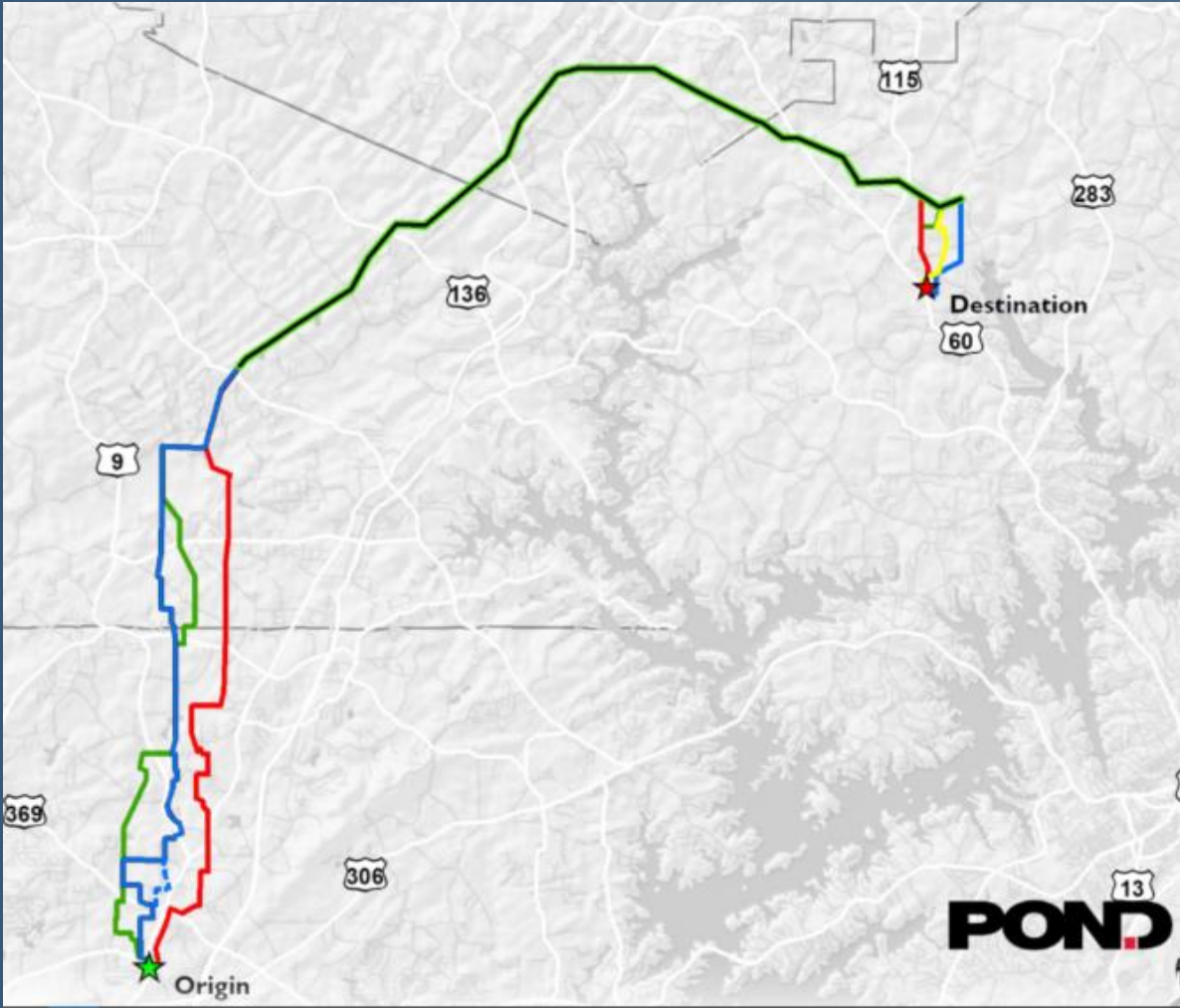




# 2 Site Investigation

## Overview

- Notified of Proposed Route/Alt Routes
- Site Visit
- Data Collection
- Data Entry

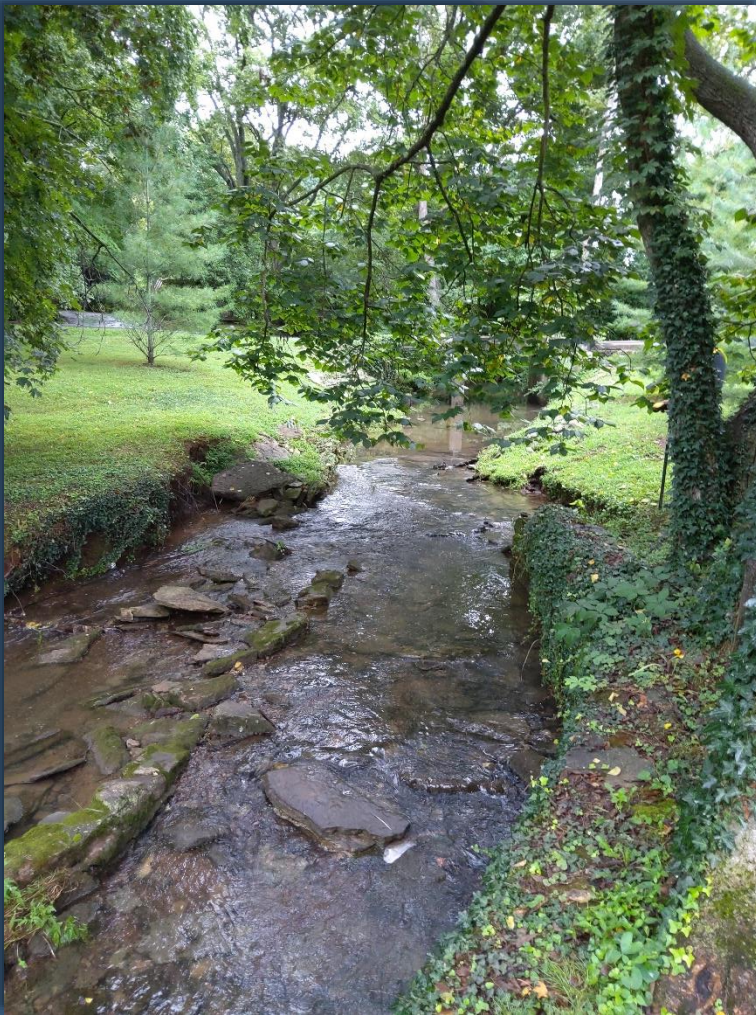




# 2 Site Investigation

## Site Visit and Analysis

- **Collect Site Data**
- **Define Nature & Extent of Resources**
- **Determine Conflicts / Constraints**
  - **State or Federal Water**
  - **Exposed Rock Shelves**
  - **Special Aquatic Site**
  - **Protected Species Habitat**
  - **FEMA Floodplain**
  - **Slope Seeps**
- **Upload Data to Database**

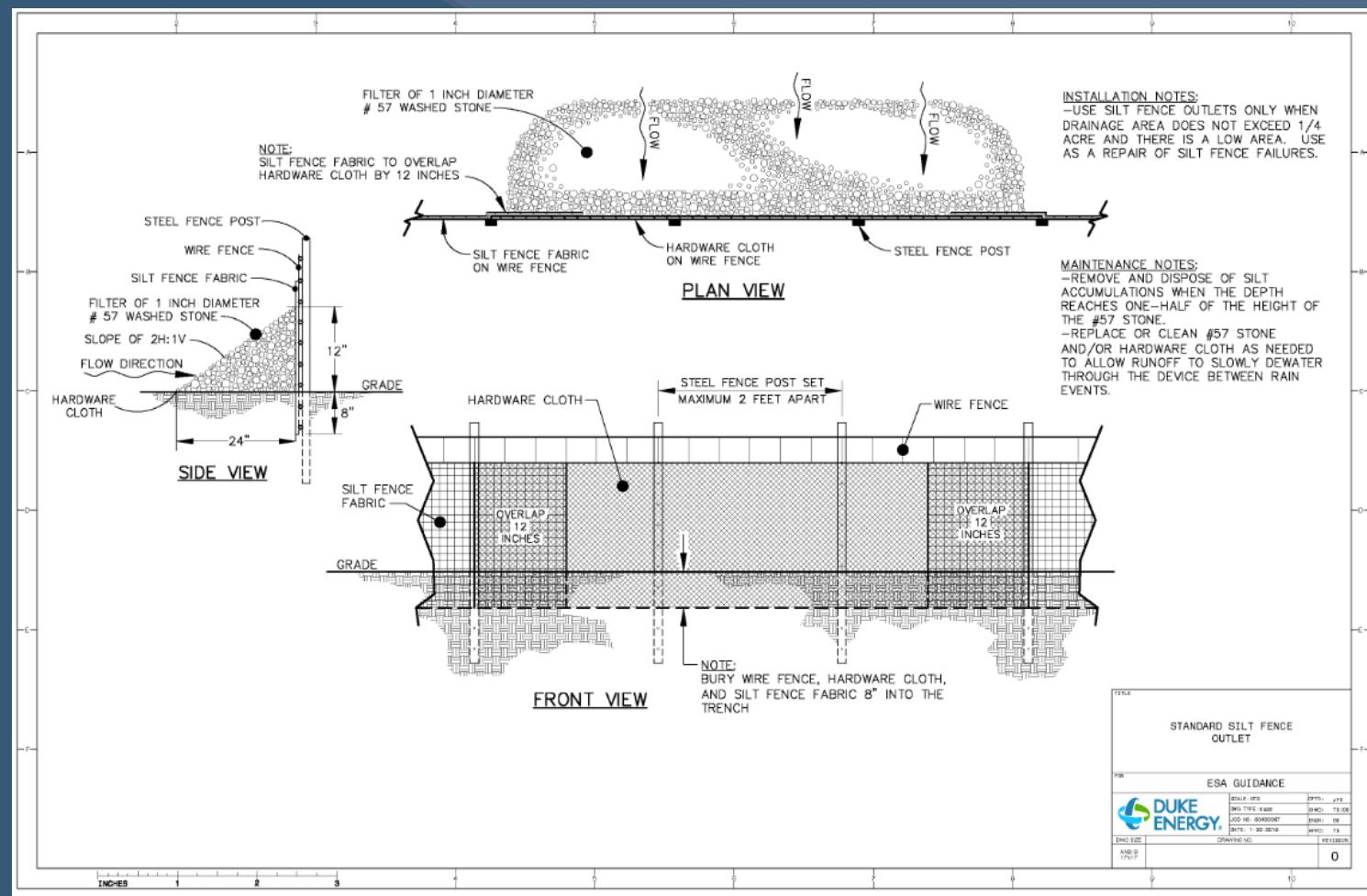
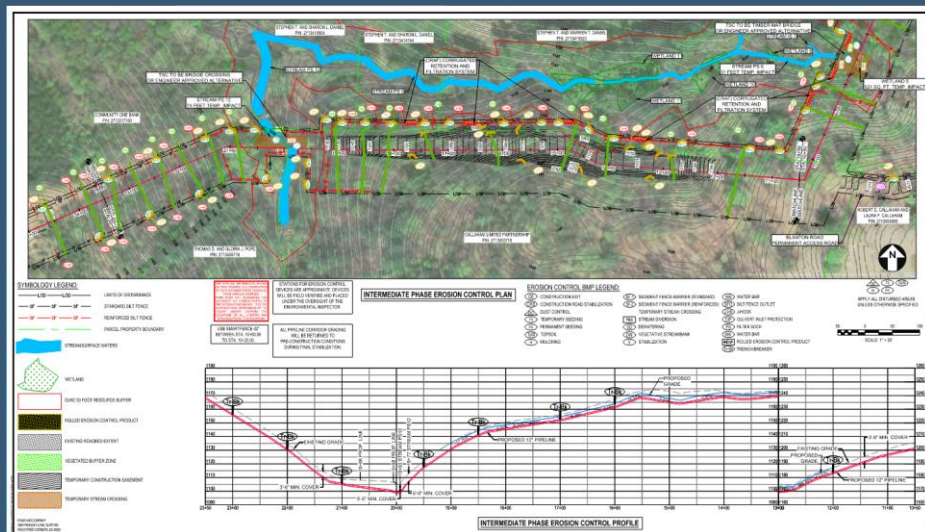




## 3 Design

## Overview: Erosion and Sedimentation Control

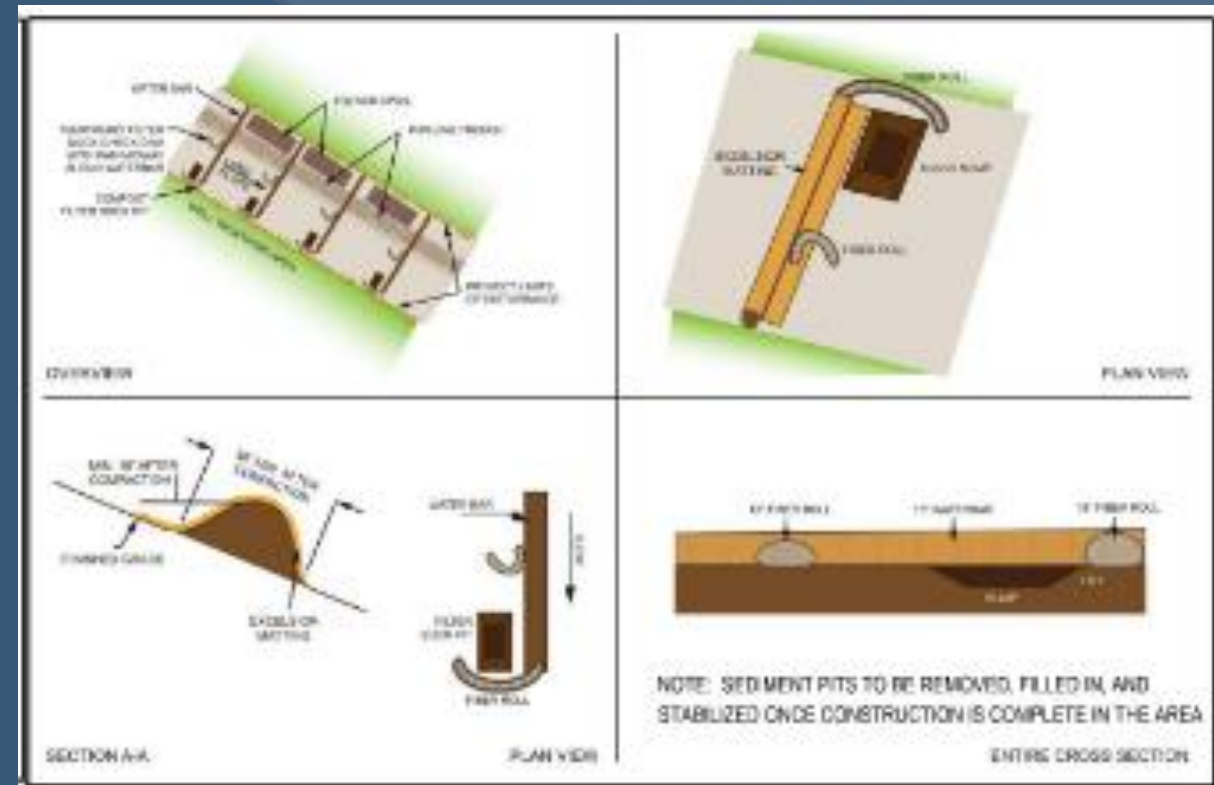
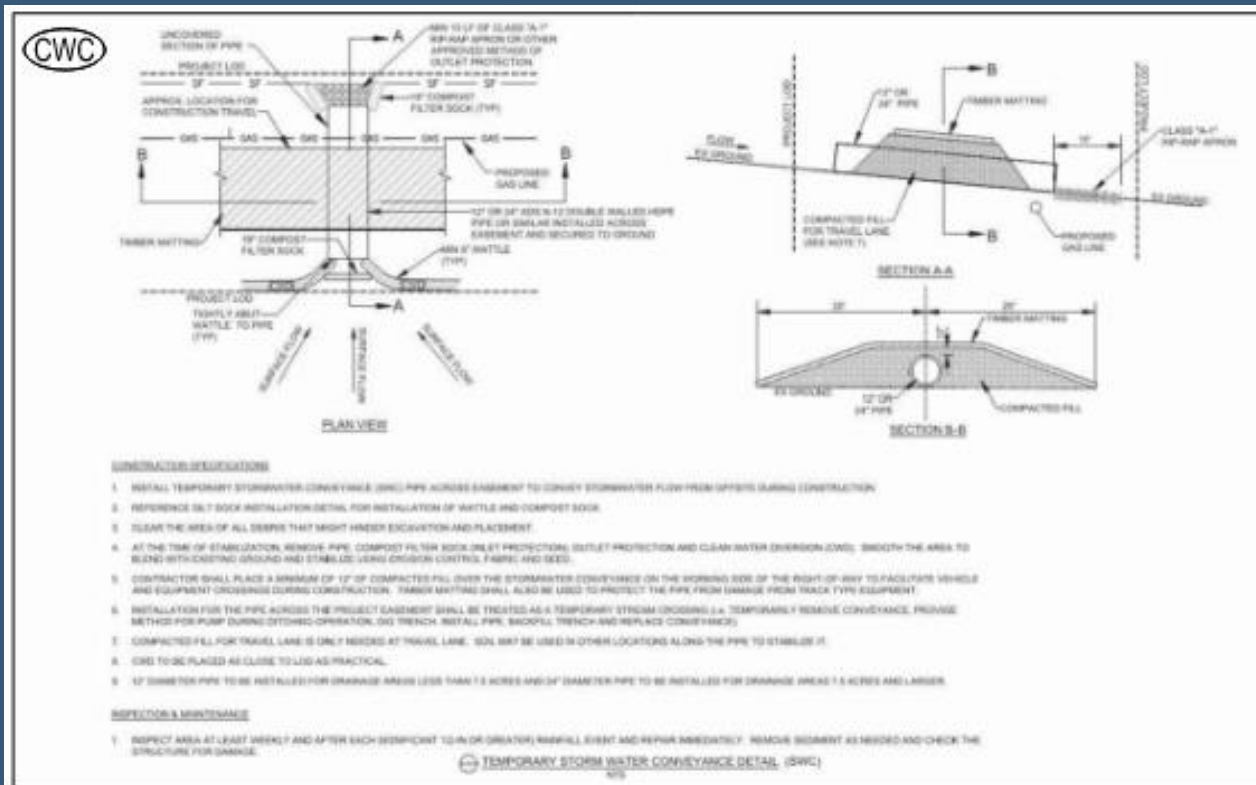
- **Consider regional requirements**
- **Review requirements compared to past lessons learned**
- **Determine Installation method**
- **Gather Contractor Input**





## 3

## BMPs not in Georgia Manual for Erosion and Sediment Control



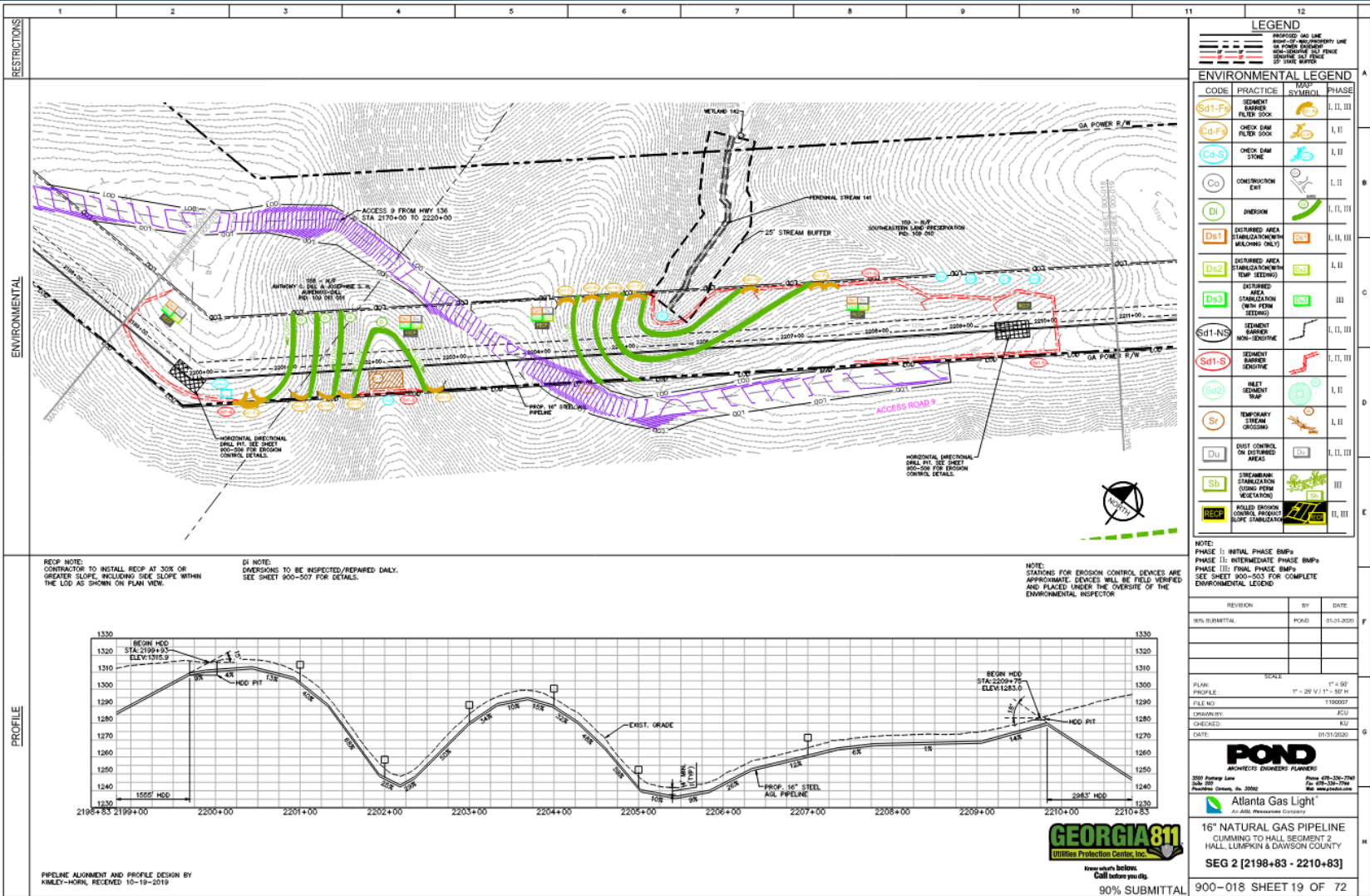
# 3 Design

## Erosion Prevention and Sediment Control Planning & Design

Utilized to meet requirements of all regulatory agencies and associated permits

- Buffer Zones
- Reductions in Workspaces
- Avoidance of ESA

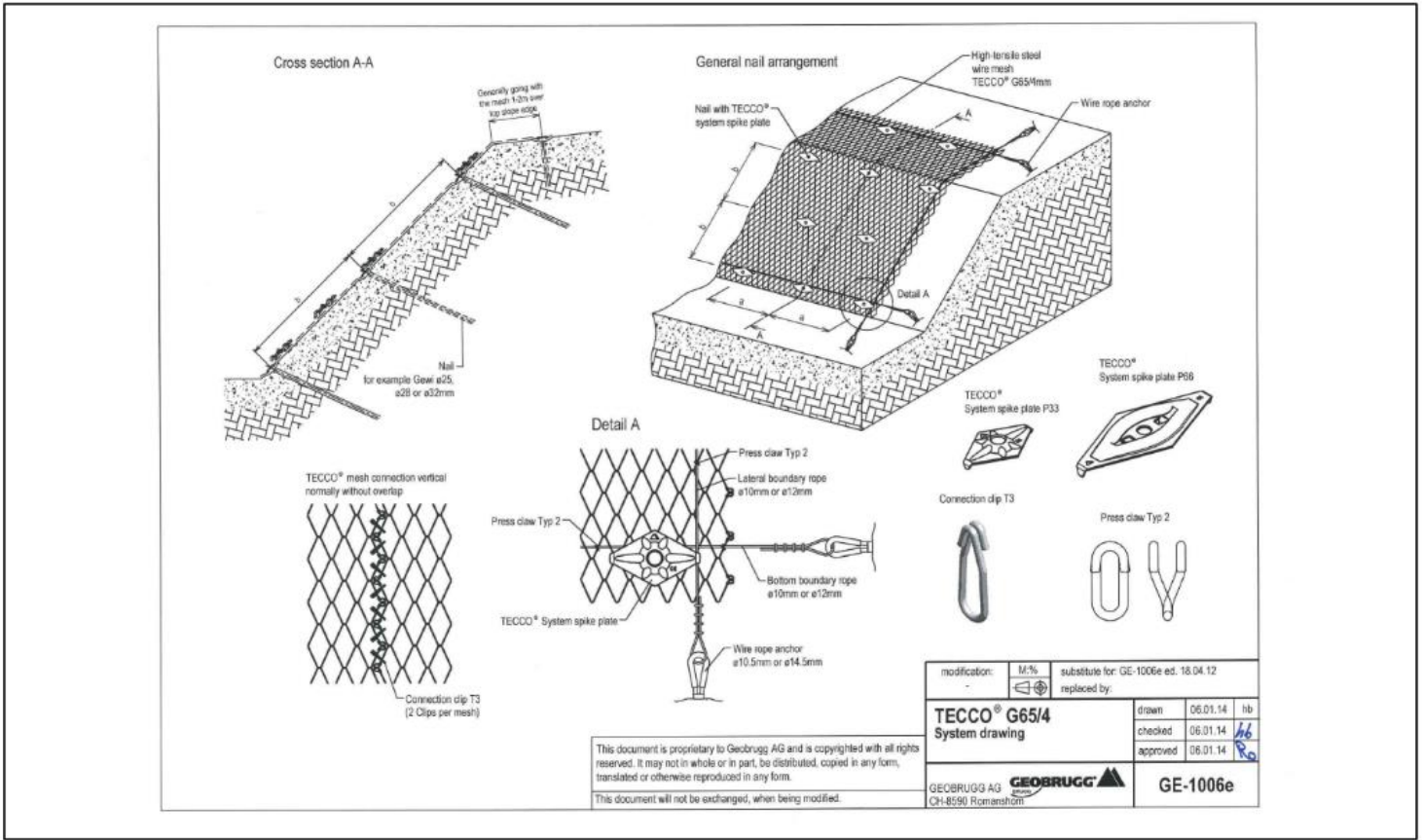
Use of authorized ECDs creatively



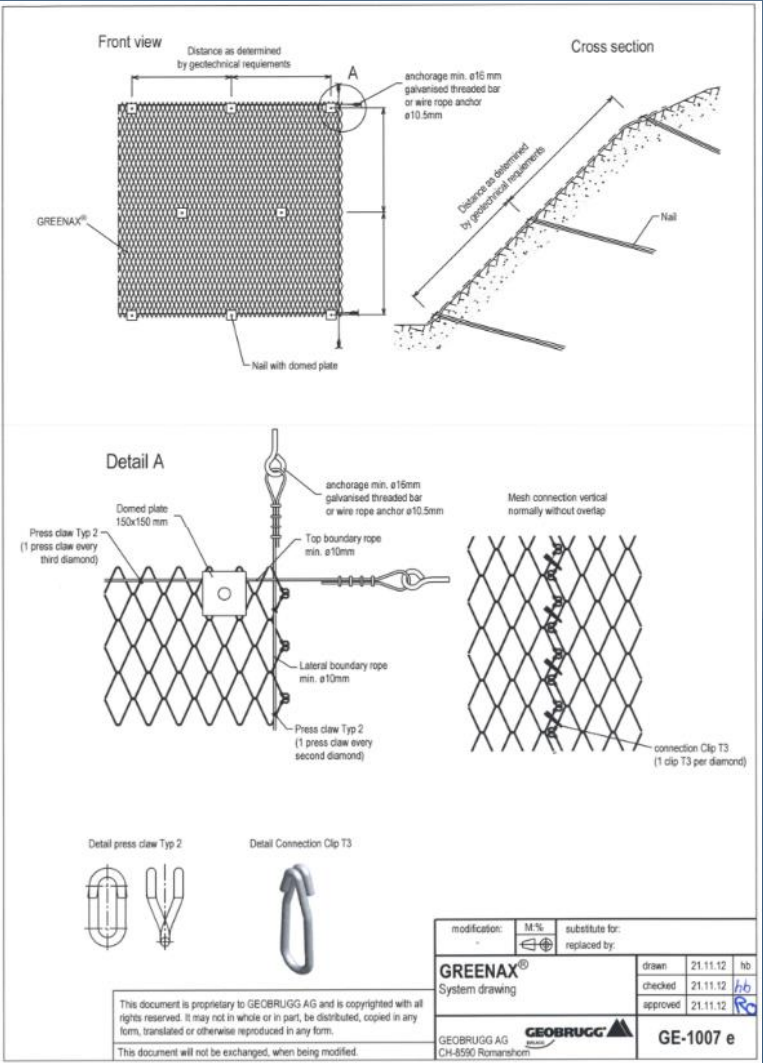


# 3 Design

## Slope stabilizing materials



GEOBRUGG–TECCO SYSTEM – WIRE MESH STABILIZATION



# 3 Design

## Regulatory Considerations: Local, State, and Federal Permits

### State Permitting Agencies

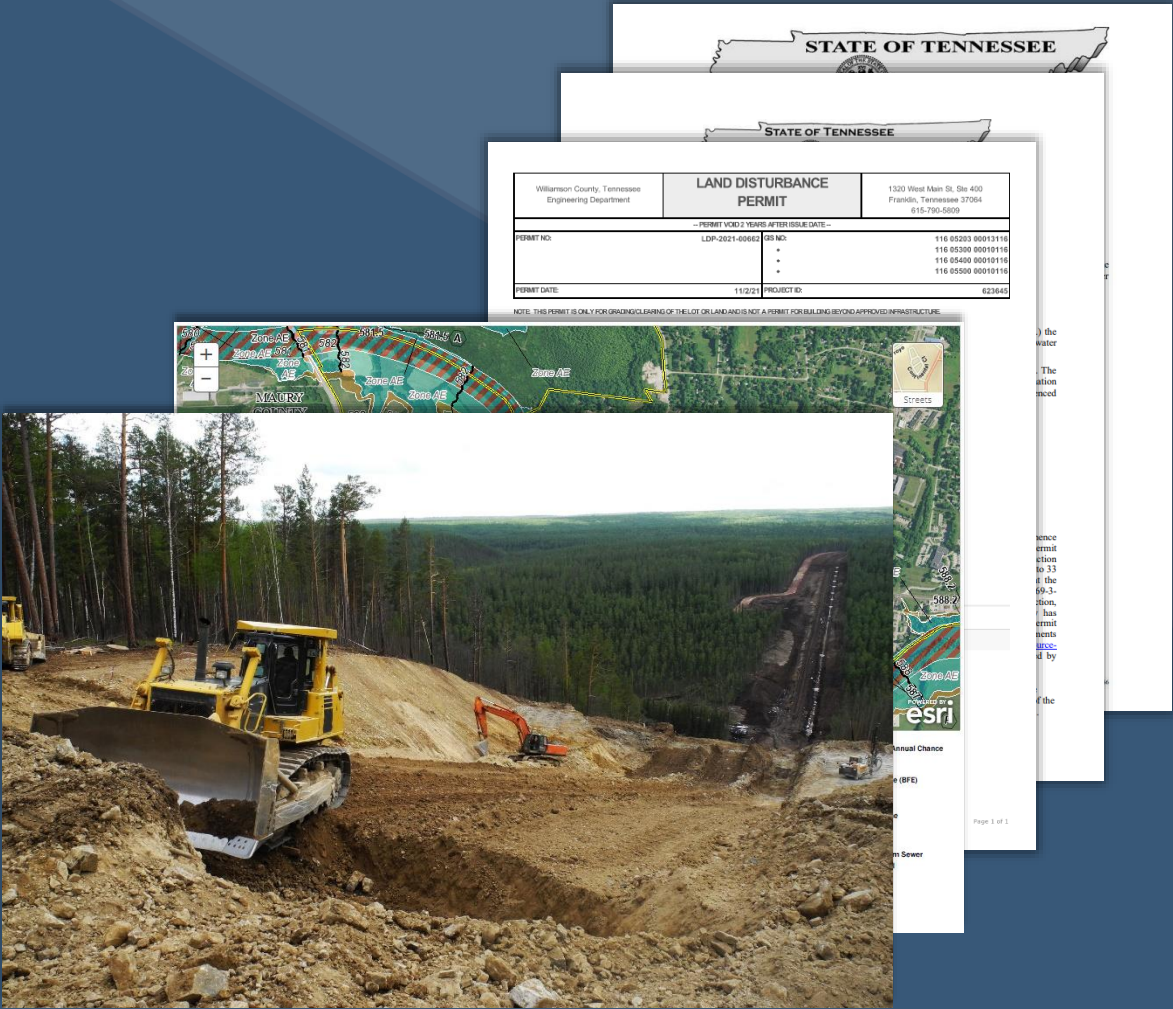
- Construction Stormwater Permits
- Hydrostatic Testing/Dewatering Permits

### City and County Jurisdictions

- Land Disturbance Permit
- FEMA Floodplain Encroachment Coordination
- Locally Regulated Aquatic Buffer Encroachment Coordination

### Federal Agencies

- US Army Corps Of Engineers
- Federal Energy Regulatory Commission
- US Fish and Wildlife Service





# 4 Construction

## Specific Area Work Plans

- **Confirm the design can be built as designed**
- **Consider specifics for areas of high safety hazard.**



### APPROXIMATE STA 333+00 TO APPROXIMATE STA 334+00

The following pipeline installation construction process will be followed during the installation of the Bluestone Loop 30-inch outside diameter (OD) pipeline. The pipeline right-of-way (ROW) will be cleared and graded from approximate STA 333+00 to approximate STA 334+00 to facilitate the installation of the 30-inch OD steel pipeline. All necessary erosion control devices (ECD's) will be installed along the steep slope pipeline installation ROW. The pipeline trench will be excavated and the trench bottom will be prepared by installing earth filled bags in the bottom of the trench to protect the pipe from engaging any rocks or debris lying in the bottom of the trench. Approximately 100 feet of the 30-inch OD steel line pipe will be strung, bent, welded, x-rayed, and coated, in one single continuous section, beside the excavated trench. The approximately 100 foot 30-inch OD pre-fabricated steel pipe section will be secured with pipe to sub grade cable anchors to ensure the pipe section will remain in place prior to lowering in the pipe section in to the trench. The 30-inch OD pre-fabricated pipe section will then be inspected for coating holidays, pipe lowering in operations will be completed and the trench breakers installed. The pipe will be mechanically padded, and backfill of the trench will be completed. Permanent water bars will be installed and the final grade and ROW restoration of the pipeline ROW will be completed. The lowered in pipe section will then be tied in to the previously installed 30-inch OD steel pipe at approximate STA 333+00. The tie in weld will be x-rayed, coated, and inspected for coating holidays. Excavator shaker buckets will be used to pad the pipe with fine spoils at the tie in locations to protect the pipe from any rocks in the backfill materials.

The installation of the pre-fabricated 100 foot 30-inch OD steel pipe section will not require any tie in to be performed on the steep slope.

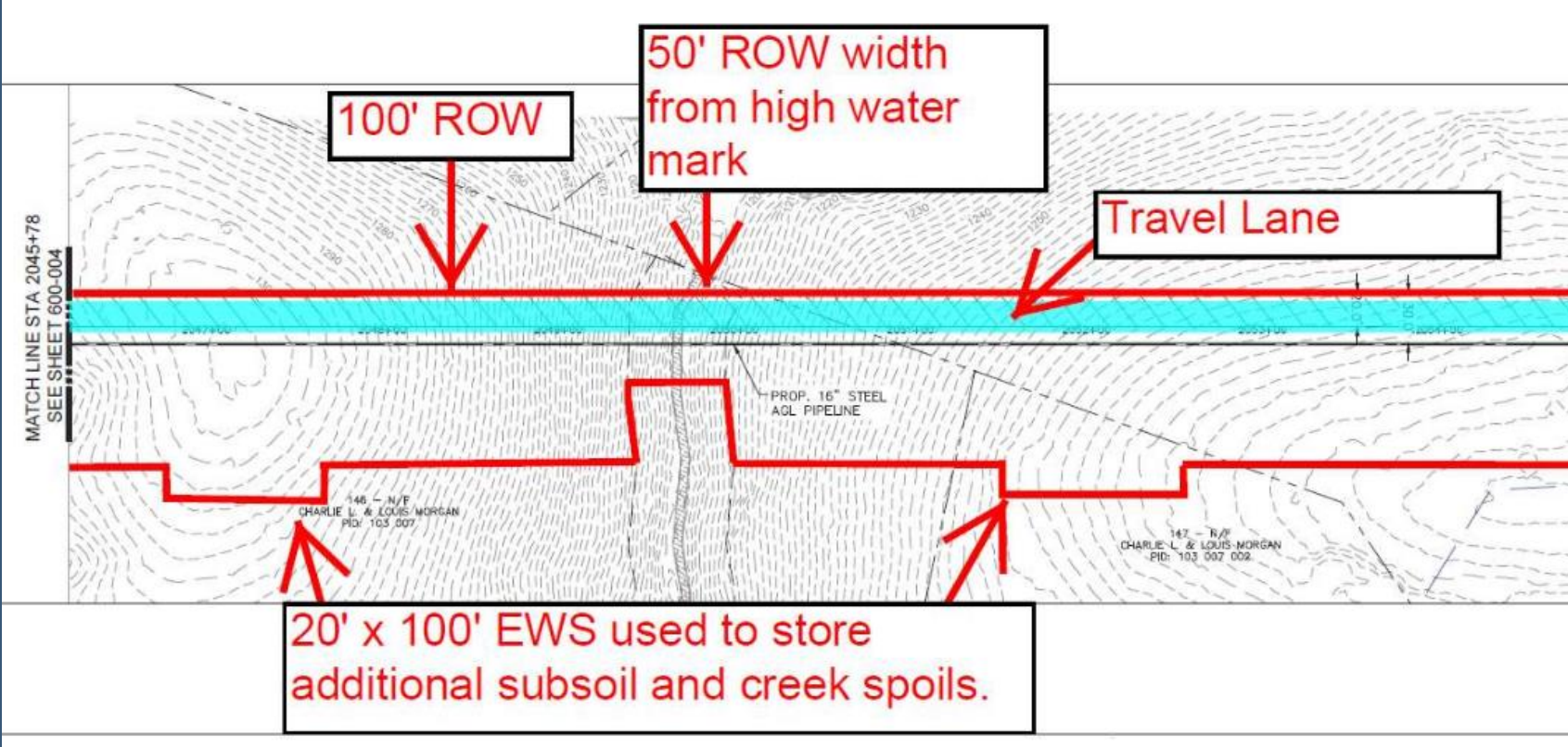
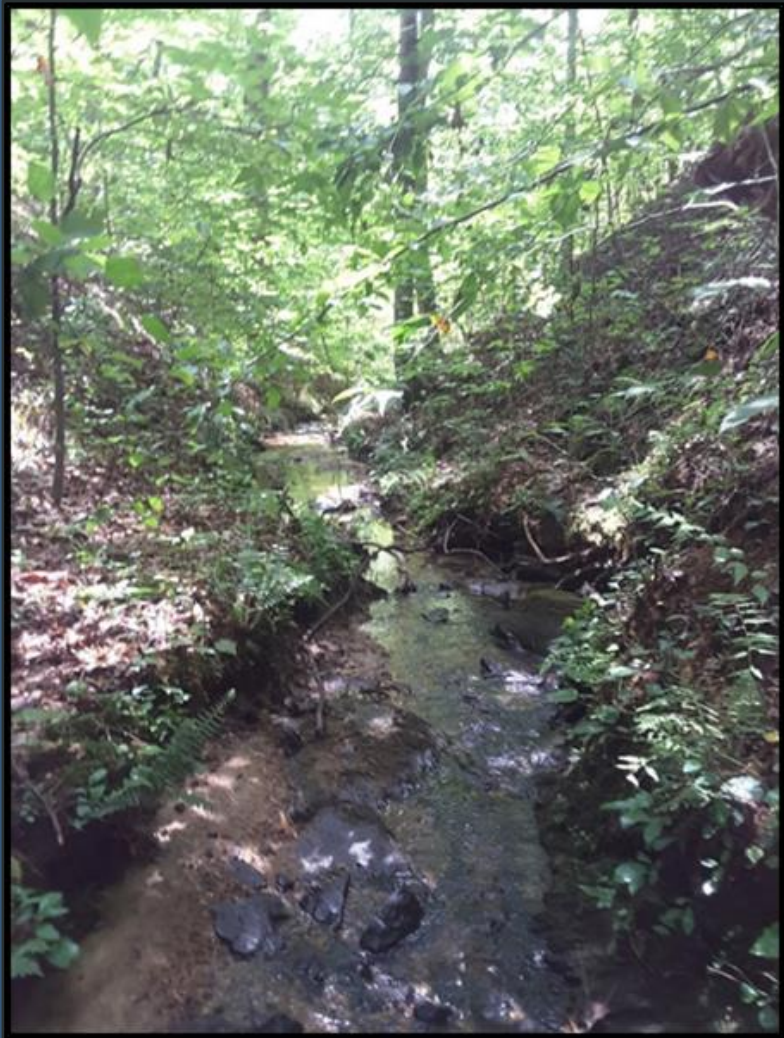
Due to the abundance of rock ledges and rock outcroppings, winch tractors with 1-¼ inch or larger winch cables will be utilized to enhance equipment stability when equipment is engaged in any work being performed on the steep slope. All mobile equipment operators will ensure they wear a seat belt at all times during any steep slope construction operations.

All temporary water bars and slope breakers will be graded smooth prior to any equipment or vehicles traveling up or down steep slope, but replaced at the end of each workday.



# 4 Construction

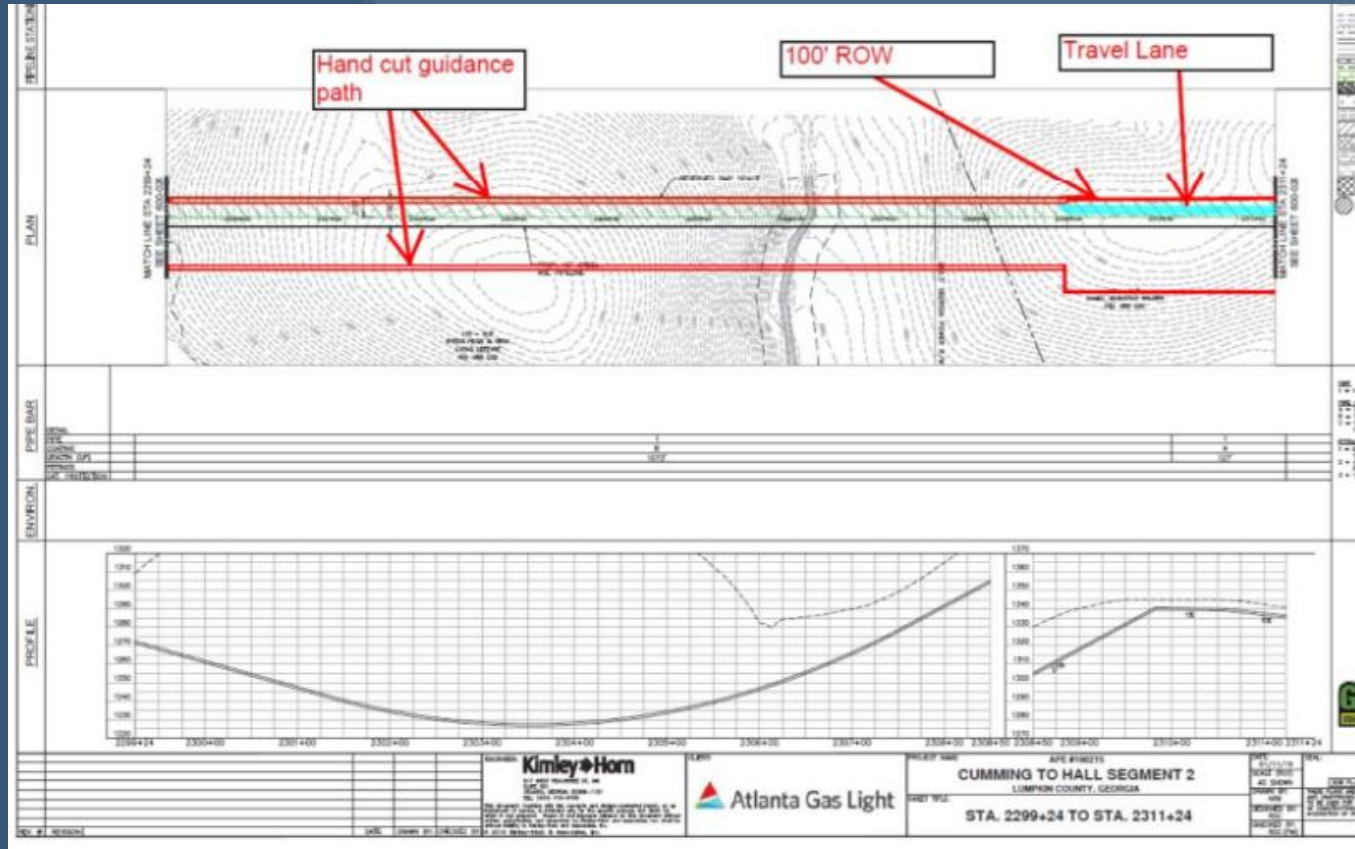
## Regulatory Requirements Require Additional Workspaces





## 4 Construction

## Hazard Identification VS. Hazard Avoidance





# 4 Construction

## Difficult Slopes = Difficult Construction





# 4 Construction

## Full Range of CA, Inspection, and Compliance Services

- Construction Oversight
- SWPPP and BMP Design Administration
- Vegetation Restoration Plans
- Environmental Inspections
- Punch List and Close-out

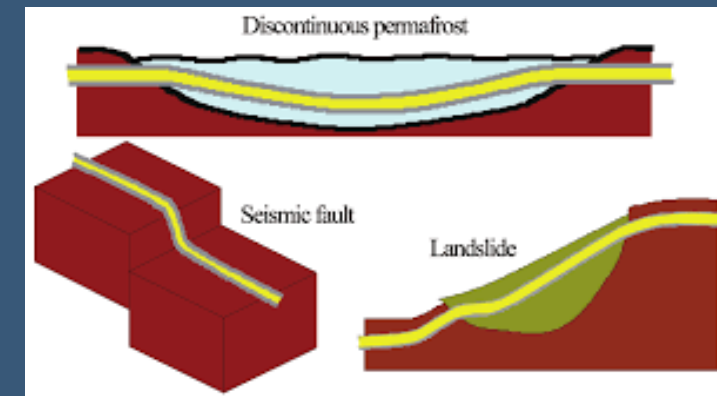
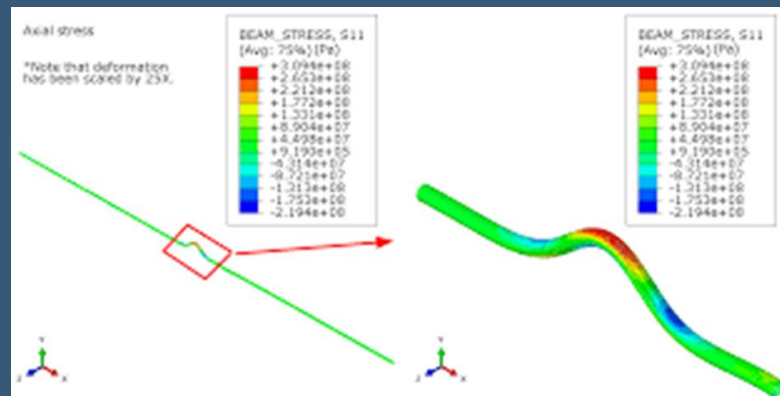




# 5 High Hazard Area Monitoring

## Geo-Hazards

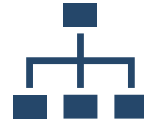
- Modeling of complex soil/slope interactions
- Assess stress, strain, and fatigue
- Simulate subsidence/landslides
- Smart Pigging
- Predict future performance/maintenance
- Allow for scheduling routine maintenance
- Allow for forecasting and capitalizing maintenance costs





# Successful Team's Services

**Program & Project Management**



**Asset Assessment | GIS  
& Data Management**



**Construction &  
Inspectors**



**Environmental &  
Regulatory Expertise**



**Full-Service Design  
Capabilities**







Thank You

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